TRUBILKO, V.I.

PHASE I BOOK EXPLOITATION SOV/5452

Donskoy, Ya. Ye., G.I. Kardash, and I.P. Lyalyuk, eds.

Mekhanizatsiya i avtomatizatsiya; sbornik statey ob opyte vnedreniya mekhanizatsii i avtomatizatsii na khar'kovskikh mashinostroitel'nykh zavodakh (Mechanization and Automation; Collection of Articles on the Introduction of Mechanization and Automation in Khar'kov Machinery-Manufacturing Plants) [Khar'kov] Khar'kovskoye knizhnoye izd-vo, 1960. 373 p. 3,900 copies printed.

Editorial Board: S.A. Vorob'yev, Candidate of Technical Sciences; Chairman of the Editorial Board: P.I. Zmaga, Engineer; A.A. Kutlov, Engineer, V.I. Kurubov, Engineer, A. Ye. Leonov, Docent, A.I. Tupitsyn, Candidate of Technical Sciences, and S.M. Khmara, Candidate of Technical Sciences; Eds.: Ya. Ye. Donskoy, G.I. Kardash, and I.P. Lyalyuk; Tech. Ed.: M.I. Limanova.

PURPOSE: This collection of articles is intended for technical and scientific personnel, outstanding workers, and shock workers of communist labor.

COVERAGE: The multifaceted experience of Khar'kov enterprises in the mechanization, automation, and improvement of manufacturing processes is generalized. The development of new machines, instruments, and production methods is considered and attention is given to newly established enterprises, and to the introduction of telemechanics in the Khar'kov gas-system management. By including concrete examples and facts, the authors of the various articles attempt to demonstrate the achievements of the Khar'kov industrial complex in fulfilling the resolutions of the June (1959) and July (1960) Plenums of the Central Committee of the Communist Party of the Soviet Union. No personalities are mentioned. There are no references.

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Mechanization and Automation (Cont.) SOV/5452

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AVAILABLE: Library of Congress (TJ1160.M395)

S/137/62/000/004/167/201
A154/A101

12300

AUTHORS: Savchenkov, V.A.; Trubilko, V.I.

TITLE: Manual and semiautomatic electroslag welding

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 26, abstract 4E130 (Sb. "Mekhaniz. i avtomatiz.", Khar'kov, Knigoizdat, 1960, 317 - 325)

TEXT: Experimental data are given on development of a technology for the manual and semiautomatic electroslag welding of up to 500 mm long welds in parts with a wall thickness of 25 - 65 mm. Manual electroslag welding is done with 6 mm bare electrode wire. For welding low-carbon steel Cb-10ГС (Cb-10GS) or Cb-08А (Cb-08A) wire and АН-348А (AN-348A) flux may be used. Power is supplied by a ТСД-1000 (TSD-1000) type transformer. Welding is done by an electrode comb (grebenka elektrodov) consisting of 2 - 3 rods, depending on the metal thickness. A ПШ-5 (PSh-5) semiautomatic welder was used for semiautomatic electroslag welding. Without a lengthened nozzle the semiautomatic welder could weld 100 - 120 mm high seams; for seams up to 500 m the nozzle should be $\geq$ 600 mm. A TSD-1000 transformer fed the arc. For welding grade 3 steels, 2 mm Cb-08A and Cb-10Gs welding wire and AN-348A flux was used. Parts with up to 45 mm thick walls were welded

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S/137/62/000/004/167/201
A154/A101

Manual and semiautomatic electroslag welding

with one electrode wire, when the wall thickness is 45 - 65 mm 2 wires should be used, for which purpose the guiding nozzle should have 2 channels.

V. Klyuchnikova

[Abstracter's note: Complete translation]

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SAVCHENKO, V.A., kand.tekhn.nauk; TRUBILKO, V.I., inzh.

Electric slag welding by consumabel electrodes of stator shells for electric machines. Svar. proizv. no.5:30-31 My '61. (MIRA 14:4)

1. Ukrainskiy nauchno-issledovatel'skiy institut metallov.
(Electric welding) (Motors, Induction—Welding)

S/135/61/000/006/005/008
A006/A106

1.2300

AUTHORS: Savchenkov, V.A., Candidate of Technical Sciences, Trubilko, V.I., Engineer

TITLE: Resistance against intercrystalline corrosion of thin-sheet stainless steel joints, welded in carbon dioxide

PERIODICAL: Svarochnoye proizvodstvo, no 6, 1961, 28 - 30

TEXT: The authors tested intercrystalline corrosion strength of 1 - 3 mm thick stainless 1Kh18N9T (1Kh18N9T) steel. The tests were made in accordance with methods A and AM of GOST 6032-58. Specimens for the tests were cut out of 3 mm thick plates, butt welded by one- and two-sided cross seams with d-c of reverse polarity on the A-547 semi-automatic machine. Св-1Х18Н9Т (Sv-1Kh18N9T) 1 mm-wire was used. Welding current was 115-125 amps; arc voltage 19-20 v, welding speed 25-27 m/hour; carbon dioxide consumption 6-8 l/min. The chemical composition of the steel, the welding wire and the weld metal is given in Table 1. Intercrystalline corrosion tests were made according to method A (continuous boiling for 72 hours in a solution of 110 g $CuSO_4 \cdot 5H_2O$; 55 ml H_2SO_4 of 1.835 density; 1 liter of water) and method AM (continuous boiling for 24 hours in a solu-

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tion of 160 g $CuSO_4 \cdot 5H_2O$; 100 ml H_2SO_4, density 1.835; 1 liter of water in the presence of copper chips). Parallel tests were performed with specimens welded in argon, which were boiled in glass retorts with reversing coolers. A number of specimens were tempered at 650°C for 2 hours prior to boiling. After boiling they were bent on a mandrel of $d = 3\delta$ and inspected. It appeared that the welds were resistant to crystalline corrosion in the state following immediately the welding process. They were not corrosion resistant after 2 hours tempering at 650°C. The weld joints show high ductility (bending angle - 180°). Their strength equals that of the base metal. There are 3 tables and 3 figures.

ASSOCIATION: Ukrainskiy NII metallov (Khar'kov) (Ukrainian Scientific Research Institute of Metals, Khar'kov)

Table 1:

Metal investigated / Исследуемый металл	Chemical composition / Химический состав в %					
	C	Mn	Si	Cr	Ni	Ti
1Kh18N9T steel (δ = 3 mm) / Сталь 1Х18Н9Т ($\delta = 3$ мм)	0,10	1,10	0,48	18,11	10,04	0,44
Sv-1Kh18N9T welding wire (d = 1 mm) / Сварочная проволока Св-1Х18Н9Т ($d = 1$ мм)	0,11	1,37	0,55	18,20	9,06	0,55
Weld metal / Металл шва	0,15	1,20	0,47	18,08	9,36	0,31

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SAVCHENKOV, V.A., kand.tekhn.nauk; TRUBILKO, V.I., inzh.; BRODSKIY, A.Ya., kand.tekhn.nauk; FRIDMAN, A.M., mladshiy nauchnyy sotrudnik

Weldability of St. 5ps capped reinforcement steel. Prom.stroi. no.10:51-53 '62. (MIRA 15:12)

1. Ukrainskiy nauchno-issledovatel'skiy institut metallov (for Savchenkov, Trubilko). 2. TSentral'nyy nauchno-issledovatel'skiy institut stroitel'nykh konstruktsiy Akademii stroitel'stva i arkhitektury SSSR (for Brodskiy, Fridman).
(Concrete reinforcement—Welding)

SAVCHENKO, V.A., kand.tekhn.nauk; TRUBILKO, V.I., inzh.

Oxygen cutting with natural gas. Svar.proizv. no.9:26-28 S '60. (MIRA 13:8)

1. Ukrainskiy nauchno-issledovatel'skiy institut metallov.
(Gas welding and cutting)

TRUBILOV, G., starshiy leytenant.

On an assault cruise. Sov.mor.15 no.22:12 N '55. (MLRA 9:6)
(Naval maneuvers)

TRUBILOV, M.A., kand.tekhn.nauk; BOREVSKIY, Ye.I., inzh.; PROKHOROV, S.A., inzh.

Changes in the radial air gaps of steam turbines during the start and operation [with summary in English]. Teploenergetika 5 no.12:48-55 D '58. (MIRA 11:12)

1. Vsesoyuznyy teplotekhnicheskiy institut.
(Steam turbines)

AUTHORS: Trubilov, M.B. (Cand.Tech.Sci.) SOV/96-58-12-9/18
Borevskiy, Ye.I. (Engineer)
Prokhorov, S.A. (Engineer)

TITLE: Changes in the radial clearances in steam turbines during starting and operation. (Izmeneniye radialnykh zazorov v parovykh turbinakh pri puske i ekspluatatsii)

PERIODICAL: Teploenergetika, 1958, No.12, pp. 48-55 (USSR)

ABSTRACT: A good deal of damage has been caused by fouling of the rotors and glands during the starting and operation of steam turbines; it has usually been attributed to failure to observe the starting instructions. In 1955-56 the All-Union Thermo-Technical Institute made tests on one of the turbines to elucidate the reasons for gland wear. The radial clearances were measured simultaneously at four places round the shaft by means of impulse nozzles, as illustrated in Fig.1; the nozzles approached the cylindrical surface of the shaft and discharged air or steam at a rate which denoted the clearance. The general principles of this method of gauging were described in an article by Rubinshteyn and Trubilov in Teploenergetika No.7, 1958. The test results are presented graphically in Fig.2. It will be seen that in a turbine the main redistribution of clearances took place during erection, the main reason being that the lower part of the turbine casing is not sufficiently rigid. As the diaphragms are installed it bends downwards, and when the more rigid upper half of the casing is bolted down, the bottom half is pulled upwards and

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more into line again. When the turbine is heated up at low speed and no-load a temperature difference arises between the upper and lower parts of the cylinder causing the cylinder to bend which reduces the lower clearance by a further half millimetre. Thus, when the turbine was started from the cold the radial clearances underneath the shaft were almost 1.2 mm less than the values measured during erection. Conditions would naturally be worse when the turbine is started up from the partly-cold condition when temperature differences are liable to be greater. Somewhat later similar investigations of the radial clearances were made on an (illegible) 50 MW turbine with initial steam conditions of 70 atm and 500°C. A sectional drawing of the machine is in Fig.3. The measuring nozzles were fixed to the diaphragm of the 11th stage, located at about the middle of the length of the high-pressure cylinder. In this turbine, changes in the clearances occurred mainly as a result of disturbances of centring of the diaphragm. In the previous turbine the diaphragms were lifted upwards relatives to the holder arms when the bolts were pulled down and during heating up at low speeds; in the 50 MW machine, displacement of the diaphragms in both vertical and transverse directions mainly occurred during changes in the load on the turbine. It will be seen from the readings plotted in Fig.4. that the vertical displacements coincided with changes in

Changes in the radial clearances in steam turbines during SOV 96-58-12-9 15
erection, starting and operation.

the load, whereas transverse displacements lagged [illegible]
somewhat, as shown by the corresponding [illegible]. The reasons for the
observed changes in the clearances are discussed at some length.
Measurements of the clearances were also made in the forward-end
gland of an [illegible] MW turbine. In this case the measuring points
were installed directly on the turbine casing as shown in [illegible].
Eccentricity of the rotor observed in this gland during testing of the
turbine is shown charted in [illegible]. As the speed rises, the rotor
lifts and is displaced to the right relative to the casing, as the
load is taken up the rotor rises further, apparently due to temperature
deformation of the cylinder. After full load was reached the rotor
gradually fell, and after about three hours was some 0.1 mm below its
initial position. The reasons for this are discussed. Thus these
first tests to measure changes in the clearances during the starting
and operation of three different types of turbine revealed a number
of important causes of damage to glands. The most instructive of these
was the inadequate rigidity of the lower part of the casing of the first
turbine. A formula is given for calculating the thermal loading of the
turbine casings; the validity of the formula was verified by
measurements on the turbine. Two other causes of reduced clearance
are considered, namely, expansion of blading and ellipticity
Card 3/4 distortion of the cylinder. A systematic classification of the causes

Changes in the radial clearances of steam turbines during erection, starting and operation

of change in clearances is charted in Fig.10. Further investigations will be required to accumulate experimental data and to find ways of obviating the most dangerous of these effects during design and operation of turbines. There are 10 figures and [illegible] references.

ASSOCIATION: All-Union Thermo-Technical Institute (Vsesoyuznyy Teplotekhnicheskiy Institut)

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L 30784-66 EWP(k)/EWT(d)/EWP(h)/T-2/EWP(l)/EWP(f)/EWP(v) WW

ACC NR: AP6022096 SOURCE CODE: UR/0096/66/000/004/0025/0029

AUTHOR: Trubilov, M. A. (Candidate of technical sciences); Prokhorov, S. A. (Engineer)

ORG: All-Union Heat Engineering Institute (Vsesoyuznyy teplotekhnicheskiy institut)

TITLE: Investigation of the unevenness in heating of the cutoff valve in the T-100-130 turbine during startup

SOURCE: Teploenergetika, no. 4, 1966, 25-29

TOPIC TAGS: heating engineering, turbine, valve, thermocouple, turbine design, turbine rotor, heat balance, heat insulation/T-100-130 turbine

ABSTRACT: Experimental data are presented from an investigation of the temperature field of the cutoff valve of the T-100-130 turbine and an analysis of the operating conditions of its mountings during startup. For the investigation, 12 thermocouples were installed in a valve, which was then subjected to various starting regimes, including that recommended by the factory. In order to increase the reliability of the valve mountings, the authors recommend: 1) in the development of new valve designs an attempt to create identical heating conditions for cover and body; 2) the best possible heat insulation of valve caps; 3) pre-heating of the valves before starting the rotor; 4) lower than normal parameter steam whenever possible during startup, followed by gradual increase to nominal parameters; 5) checking temperature differences of valve parts during operation. Orig. art. has: 5 figures and 5 formulas. [JPRS]

SUB CODE: 13 / SUBM DATE: none

Card 1/1 JS UDC: 621.165.621.882.5.0001.5

RUBINSHTEYN, Ya.M., doktor tekhn.nauk; TRUBILOV, M.A., kand.tekhn.nauk

Steam jet method for measuring the clearances between the rotating and stationary parts of steam turbines [with summary in English]. Teploenergetika 5 no.7:68-74 Jl '58. (MIRA 11:9)

1.Vsesoyuznyy teplotekhnicheskiy institut.
(Steam turbines)

LEYZEROVICH, A.Sh., inzh.; TRUBILOV, M.A., kand.tekhn.nauk; PROKHOROV, S.A., inzh.; KULICHIKHIN, V.V.

Buckling of steam turbine housings due to thermal stresses. Teploenergetika 12 no.10:57-62 O '65. (MIRA 18:10)

1. Vsesoyuznyy teplotekhnicheskiy institut.

SOV/91-59-2-25/33

AUTHORS: ~~Trubilov, M. A.,~~ Candidate of Technical Sciences, Chernetskiy N. S., Engineer

TITLE: New Methods of Starting Up Steam Turbines (Novyye metody puska parovykh turbin)

PERIODICAL: Energetik, 1959, Nr 2, pp 33 - 37 (USSR)

ABSTRACT: The authors describe the so-called "blochnyy" (block) methods of starting up steam turbines, introduced by the southern section of ORGRES and tested on VK-120-2 steam turbines by VTI and LMZ. Basically, the new methods differ from the conventional method in that all steam cut-off members of the steam pipes from boiler to turbine are open and all drainage outlets, with exception of drainage connected with the condenser, are closed when the block (boiler-turbine) is being started. Application of new

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New Methods of Starting Up Steam Turbines

methods of starting-up turbines results in a considerable reduction in starting time and precludes the development of high thermal stresses in the turbine's structure. There are three graphs and 1 Soviet reference.

MAVRISHCHEV, V.S., kand. ekon. nauk; VISYULIN, F.P., kand. ekon. nauk; STROKOVA, V.I., kand. ekon. nauk; VYBORNOV, V.I., kand. ekon. nauk; LOPATIN, N.V., kand. ekon. nauk; SOSIN, L.M., kand. ekon. nauk; ZYATIKOV, Ya.M., kand. ekon. nauk; LYSOV, N.Ye., kand. ekon. nauk; NEVEL'SKAYA, K.I., kand. ekon. nauk; TRUBILKO, N.P., kand. ekon. nauk; OS'KIN, V.Ya., kand. ekon. nauk

[Chemicalization of industrial production in White Russia] Khimizatsiia promyshlennogo proizvodstva Belorussii. Minsk, Nauka i tekhnika, 1965. 126 p. (MIRA 18:5)

TRUBILOV, M.A., kand. tekhn.nauk; CHERNETSKIY, N.S., inzh.

New methods for starting steam turbines. Energetik 7 no.2:33-37 F '59. (MIRA 12:1)
(Steam turbines)

SOV/96-58-7-15/22

AUTHOR: Rubinshteyn, Ya.M., Dr.Tech.Sci. & Trubilov, M.A. Cand.Tech.Sci.

TITLE: A steam jet method of measuring clearances in steam turbines (Parostruynyy metod izmereniya zazorov v parovykh turbinakh)

PERIODICAL: Teploenergetika, 1958, No.7, pp. 68-74 (USSR)

ABSTRACT: Gaps and clearances between turbine rotors and stators are often made larger than they really need be because the consequences of interference are very serious. To study the possibility of reducing these clearances, the All Union Thermo-technical Institute developed, in 1955, a special procedure for measuring axial and radial gaps directly under all conditions of operation, including starting. In this method cylindrical nozzles of 8 - 10 mm diameter are inserted into the turbine casing at places where it is desired to follow the changes in clearance, as shown in Fig.1; a small gap is left between the end of the nozzle and the rotor. For purposes of measurement a supply of superheated steam is delivered to the nozzle at a pressure sufficient to ensure critical flow through the annular gap between the end of the nozzle and the rotor. A formula is given for the critical flow of steam through this gap, and if the steam flow is measured with an appropriate diaphragm and differential manometer, as shown in Fig.2, numerical values can be inserted into the formula for the flow and an expression for the gap length can

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be derived. The formula can be simplified if heat losses in the tube between the diaphragm and the nozzle are neglected. The formula can be still further simplified if the pressure at the diaphragm is maintained constant during the tests. The final simple relationship is plotted graphically in Fig.2., from which it will be seen that the proposed method is sensitive. For instance, if the gap changes from 1.0 to 1.1 mm, the pressure drop on the differential manometer changes from 100 mm Hg to 121 mm Hg. It is sometimes more convenient to extract steam from the nozzle than to deliver it to the nozzle; in this case too the steam flow is a function of the gap length. This method of measuring clearances was tested on a rig with the rotor both at rest and moving, using compressed air and moving the nozzle. Direct flow of air to the nozzle was studied, also reverse flow, or extraction from the nozzle. The results are given in Fig.3. It will be seen that rotation of the rotor made no difference to the results. It will also be seen that the critical pressure ratio for a square-edged nozzle was 0.2 for direct and 0.5 for reverse flow. Data on flow are given in Figs. 4. & 5., which show that when the gap is varied from 0 to 0.1 times the nozzle diameter, the flow-factor is practically constant. However, as the gap is increased from 0.1 to 0.25 times the nozzle diameter, the flow-factor is much reduced, which makes determinations more diffficult. Moreover, super-critical flow cannot always be maintained, and then

an additional correction is necessary. The procedure for making this correction is explained. It is shown that in order to determine the gap length it suffices to measure the steam pressure at the diaphragm, the pressures before and after the nozzle, and the pressure-drop across the diaphragm. Nomograms for determination of gaps with direct and reverse flows are given in Figs.6. & 7. The data for flow-factors and the corrections for deviation from critical conditions given in Figs. 3, 4, and 5, are obtained from tests in which full account was not taken of such factors as the shape of the nozzles and their edges or the surface roughness. However, the data can be used to measure gaps with sufficient accuracy for practical purposes. This is evident from the data given in Fig.8., obtained during tests of the influence of axial clearances on efficiency obtained during tests on an English Electric turbine type AT-25. The rotor of this turbine could be displaced axially during operation by means of a special hand-drive. Rotor displacement was measured by the steam-jet apparatus and also by a mechanical indicator and it will be seen that agreement is good, for example 0.5 mm by mechanical method and 0.48 mm by jet. If better accuracy is required, the nozzles must be specially calibrated, especially for large gaps. Procedure can be simplified if the pressure in the turbine chamber in which the gaps are located is always above atmospheric, as in a superposed turbine.

Steam can then be extracted from the nozzles to a low-pressure line. The formulae required for this case are given and it is shown that only two measurements may be made, namely, the pressure in the turbine chamber and the pressure before the measuring nozzle. The clearance may then be determined from a formula or from the homogram given in Fig.7. A more convenience nomogram constructed for one case of measuring the actual clearance in the flow path of a turbine when the diameter of the impulse nozzle is 10 mm, and of the measuring nozzle 15 mm, is given in Fig.9. To reveal the causes of changes in radial clearances in turbines, four impulse nozzles must be installed at each section investigated, above and below and to right and left of the shaft. Changes in the centring can then be observed as well as changes due to thermal expansion. The procedure for doing this is explained and an example of measurements on the forward gland of a 6-MW Siemens-Schuckert turbine installed in the Heat and Electric Power Station of the All-Union Thermotechnical Institute is given in Fig.10. It will be seen from the graph that as the turbine speeds up the rotor is displaced to the right and upwards. As the turbine is heated up the rotor first continues to be displaced upwards and then gradually falls and under steady conditions it is 0.15 mm below the initial position. The reasons for this movement are explained. A graph of this kind can be used to make a rational selection of the clearances in the forward gland of a turbine of this kind. A

A steam jet method of measuring clearances in steam turbines SOV/96-58-7-15/22

schematic diagram of the arrangements for measuring radial and axial clearances used in 1956-57 on turbines type VK-100-2 of the Leningrad Metal Works, type AK-50 of the Khar'kov Turbo-Generator Works, and on types VK-50 of the AEG firm, and others, is illustrated in Fig.11. The installation of impulse nozzles of this device in the regulating stage chamber of a turbine type VK-100-2 is illustrated in Fig.12. This method has proved very practical and has made it possible to explain the main causes of changes in clearances during starting and operation of turbines. However, because of the inertia of the method it cannot be used to follow eccentricity of the shaft resulting from temperature distortion during normal running of the rotor. It is, therefore, necessary to develop improved inertialess and simpler indicating devices based on electrical inductance or capacitance. There are 12 figures.

ASSOCIATION: Vsesoyuznyy Teplotekhnicheskiy Institut (All-Union Thermotechnical Institute)

1. Steam turbines - Design 2. Turbine rotors - Performance
3. Steam - Applications 4. Mathematics - Applications

Card 5/5

TRUBILOV, M.A., kand.tekhn.nauk; PROKHOROV, S.A., inzh.; GRIBKOV, M.N., inzh.

Effect of axial transposition of the rotor on the efficiency of a steam turbine. Izv. vys. ucheb. zav.; energ. 3 no. 7:153-158 Jl '60. (MIRA 13:8)

1. Vsesoyuznyy ordena Trudovogo Krasnogo Znameni teplotekhnicheskiy nauchno-issledovatel'skiy institut imeni F.E. Dzerzhinskogo.
(Steam turbines)

PLOTKIN, Ye.R., kand. tekhn. nauk; TRUBILOV, M.A., kand. tekhn. nauk

Start of steam turbines using steam with nominal and sliding parameters. Teploenergetika 10 no.9:6-8 S '63. (MIRA 16:10)

1. Vsesoyuznyy teplotekhnicheskiy institut.
(Steam turbines)

TRUBILOV, M.A., kand. tekhn. nauk; CHERNETSKIY, N.S., inzh.; PROKHOROV, S.A., inzh.

Temperature regime of the front packing bushings in the LMZ-series high pressure turbine under operating conditions. Teploenergetika 6 no.12:30-38 D '59. (MIRA 13:3)

1.Vsesoyuznyy teplotekhnicheskiy institut.
(Steam turbines)

231T36

USSR/Engineering - Heat, Turbines May 52

"Axial Force in the Impulse Turbine With Intermediate Overheating of Steam," M. A. Trubilov, Engr, Lab of Steam Turbines, VTI

"Iz v-s Teplotekh Inst" No 5, pp 1-7

States that analysis of failures of thrust bear-
ings in steam turbines of elec power stations re-
veals either erroneous detn of axial pressure at
turbine-building plant or excessive increase of
this pressure in operation as principal causes
for such failures. Since calcns of axial force for
impulse turbines with disk rotors is inaccurate,

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emphasizes necessity of direct measuring of this force. Describes measuring device designed by VTI on basis of using wire tensometers, and discusses its application.

231T36

TRUBILOV, M. A.

TRUBILOV, M. A.

Fuel Abstracts
June 1954
Steam Raising and
Steam Engines

4597. EFFECT OF STEAM TEMPERATURE ON END THRUST IN A TURBINE. Trubilov, M.A. (Elekt. Sta. (Pwr Sta., Moscow), Aug. 1953, Vol. 24, 20-23). Turbine tests were carried out to ascertain the influence of steam temperature on the total axial force absorbed by the thrust bearing at full load, to determine whether long operation at reduced steam temperature was permissible and whether such reduction caused damage to thrust bearings. Results showed that temperature reduction occurring during operation was not the chief cause of damage to thrust bearings. In many turbines the effect of steam temperature on axial forces is much less than theoretical calculations indicate and full load operation is permissible even at reduced steam temperature. B.E.A.

10/11/54 LM

TRUBILOV, M.A., kandidat tekhnicheskikh nauk.

Temperature conditions of thrust bearings of operating steam turbines. Elek.sta. 25 no.11:14-17 N '54. (MLRA 7:11)
(Steam turbines)

TSEPELEV, N.S.; TRUBIN, A.

X-ray examination of the mineralogical composition and genesis of clays in the variegated and lower coal-bearing series of the Tuar-Kyr region. Izv. AN Azerb.SSR. Ser.geol.-geog.nauk i nefti no.3: 59-69 '63. (MIRA 16:11)

TRUBIN, A.

Practices in the docking of ships. Mor. flot 24 no.9:43-44 S '64.
(MIRA 18:5)

1. Nachal'nik sluzhby sudovogo khozyaystva Severnogo parokhodstva.

TRUBIN, A

"Method of the master Moiseev." Tr. from the Russian. p. 45
(Industria Constructiilor Si A Materialelor De Constructii, Vol. 2, No. 10/11, Oct./Nov., 1951, Bucuresti)

SO: Monthly List of East European Accessions, Library of Congress, Vol. 3, No. 6, June. 1954, Uncl.

TRUBIN, A. S.

29355. Vliyaniye naslozennykh infektsiy na trakhoma. Izvestiya Akad. nauk Azerbaydzh. SSR, 2949, No. 8, s. 60-64. -Rezyume na azerbaydzh. yaz.

SO: Letopis' Zhurnal'nykh Statey, Vol. 39, Moskva, 1949

TRUBIN, A.I.

Simultaneous-exposure photograph of two clay samples on a single film made with a RKD-57,3 mm. camera. Izv.AN Turk.SSR.Ser.fiz.-tekh.,khim.i geol.nauk no.3:125 '62. (MIRA 16:5)

1. Institut geologii AN Turkmenskoy SSR.
(Clay--Analysis) (X-rays--Industrial applications)

TRUBIN, A.I.

Experimental data on the effect of cations on micas. Izv. AN Turk. SSR. Ser. fiz.-tekh., khim. i geol. nauk no.1:93-99 '65. (MIRA 18:7)

SANIN, S. A.; TRUBIN, A. I.

Characteristics of the mineral composition of the silt fractions of takyrs in the Murgab Oasis. Izv. AN Turk.SSSR. Ser.biol.nauk no. 6:57-63 '63. (MIRA 17:5)

1. Turkmenskiy nauchno-issledovatel'skiy institut zemledeliya.

DEMIN, M.N.; IGONIN, V.M.; GORYACHENKO, N.A.; TRINKIN, N.R.; YANTOVSKIY, I.A.; TRUBIN, A.K.

Coating leather for uppers with nitro dye solutions at high temperatures. Kozh.-obuv.prom.3 no.4:13-15 Ap '61. (MIRA 14:5)
(Dyes and dyeing—Leather)

TRUBIN, A.S., aspirant

Effect of the construction scheme of hip prosthesis and receiving chamber on the distribution of pressure on the stump. Protez. i protezostr. no.10:80-86 '64.
(MIRA 18:12)

1. TSentral'nyy nauchno-issledovatel'skiy institut protezirovaniya i protezostroyeniya.

L 24540-66

ACC NR: AP6006345 (A) SOURCE CODE: UR/0413/66/000/002/0069/0069

AUTHORS: Koryukin, V. I.; Trubin, A. S.

ORG: none

TITLE: A device for determining the pressure of a prosthetic applicance on a stump. Class 30, No. 178023 [announced by Central Scientific Research Institute of Prosthesis Fitting and Prosthesis Construction (Tsentral'nyy nauchno-issledovatel'skiy institut protezirovaniya i protezostroyeniya)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 2, 1966, 69

TOPIC TAGS: prosthetics, human engineering, pressure measuring instrument

ABSTRACT: This Author Certificate presents a device for determining the pressure of a prosthetic appliance on the stump of an arm or leg. The device includes a receiving socket and double-bearing strain gauge arms. The design provides a selective measurement of the pressure on separate sections of the stump. The strain gauge arms in the device are mounted on the surface of the fitting collar of the stump socket. The strain gauges are connected in a group to an electric

Card 1/2 UDC: 615.471:616-089.28

circuit (see Fig. 1). Each strain gauge of the group is connected to the electric

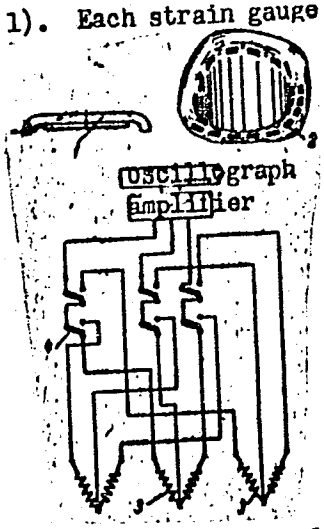


Fig. 1. 1 - strain gauge arm; 2 - fitting collar of the socket; 3 - groups of arms; 4 - toggle switches.

circuit, for example, by means of toggle switches. Orig. art. has: 1 figure.

SUB CODE: 06/ SUBM DATE: 16Dec64

Card 2/2 UDC

TRUBIN, A.S., aspirant

Application of prosthesis in a patient with tumescence of the hip stump. Protez. i protezostr. no.10:152-154 '64.
(MIRA 18:12)

1. TSentral'nyy nauchno-issledovatel'skiy institut protezirovaniya i protezostroyeniya.

TRUBIN, B.G., prof.; LUR'YE, A.B.; GRIGOR'YEV, S.M.; IVANOVICH, E.M.; MEL'NIKOV, S.V.; ANTIPIN, V.G., kand. tekhn. nauk, retsenzent; VOLKOV, B.G., kand. tekhn. nauk, retsenzent; MULLAYANOV, R.G., kand. tekhn.nauk, retsenzent; OVSYUKOV, V.N., kand. tekhn. nauk, retsenzent; BELYAYEV, A.S., st. nauchnyy sotr., retsenzent; KOZLOVSKIY, Ye.V., inzh., retsenzent; TRAK, E.E., inzh., retsenzent; SIMONOVSKIY, N.Z., red.izd-va; SPERANSKAYA, O.V., tekhn. red.

[Agricultural machines; theory, design, and calculations] Sel'skokhoziaistvennye mashiny; teoriia, konstruktsiia i raschet. Pod red. B.G.Turbina. Moskva, Mashgiz, 1963. 575 p. (MIRA 16:5)

1. Nauchno-issledovatel'skiy institut mekhanizatsii i elektrofikatsii sel'skogo khozyaystva Severo-Zapada (for Antipin, Volkov, Mullayanov, Ovsyukov, Belyayev, Kozlovskiy, Trak).
(Agricultural machinery--Design and construction)

TRUBIN, G.

Kontaktnaia Ustalnost Zubiev Priamozubykh Shesteren (Contact Fatigue of Gear Teeth) (Paper edition)

150 p. 90¢

SO: Four Continent Book List, April 1954

...rubin, G. K.

Trubin, G. K., "On friction in ball bearings", Vestnik mashinostroyeniya, 1948, No. 12, p. 5-12, - Bibliog: 15 items.

SO: U-2888, 12 Feb.53, (Letopis' Zhurnal'nykh Statey, No. 2, 1949).

TRUBIN, Georgiy Konstantinovich, kand. tekhn. nauk; POLOTSKIY, M.S., kand. tekhn. nauk, retsenzent; GUT'YAR, Ye.M., doktor tekhn. nauk, prof., red.; CHERNOVA, Z.I., tekhn. red.; UVAROVA, A.F., tekhn. red.

[Contact fatigue of gear-wheel materials] Kontaktnaia ustalost' materialov dlia zubchatykh koles. Moskva, Mashgiz, 1962. 402 p. (MIRA 15:6)

(Metals—Fatigue) (Gearing)

TRUBIN, G. K., Engineer

"Investigation of the Contact Fatigue of Spur Gear Teeth." Thesis for degree of Cand. Technical Sci. Sub 28 Jun 49, Central Sci Res Inst of Technology and Machine Building.

FDB Summary 82, 18 Dec 52, Dissertations Presented For Degrees in Science and Engineering in Moscow in 1949. From Vechernyaya Moskva, Jan-Dec 1949.

TRUBIN, G. K.

Vliianie sposoba smazki na vykrashivanie zub'ev shesteren. (Vestn. Mash., 1948, no. 6, p. 17-18)

Includes bibliography.

Effect of the lubrication method upon the chipping of gear teeth.

DLC: TN4.V4

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

TRUBIN, G. K.

O trenii v sharikopodshipnikakh. (Vestn. Mash., 1948, no. 12, p. 5-12)

Includes bibliography.

Friction in ball bearings.

DLC: TN4.V4

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

TRUBIN, G. K.

Prichina pittingostoikosti golovok zub'ev shesteren. (Vestn. Mash., 1948, no. 2, p. 26-29)

Reason for the resistance to pitting of the toothheads of gears.

DLC: TN4.V4

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

TRUBIN, G. K.

Kontaktnaia ustalost' zub'ev priamozubykh shesteren. 1950. 151 p.

Contact fatigue of the teeth of straight-toothed gears.

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

TRUBIN, G. K.

Kontaknaia vynosivost' zub'ev zubchatykh koles. (Vestn. Mash., 1950, no. 8, p. 12-15)

Contact endurance of gear teeth.

DLC: TN4.V4

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

TRUBIN, G.K., kandidat tekhnicheskikh nauk.

Investigating skew gears having off-pitch-point engagement of the second type. [Trudy] TSNIITMASH 81:109:136 '56. (MLRA 9:12)
(Gearing)

TRUBIN, G. K.

Technology

Experimental study of fatigue chipping of teeth of straight-toothed gears. Sb. "Peredachi v kashinostroeni". (Moskva.), Mashgiz, 1951

Monthly List of Russian Accessions Library of Congress, October 1951 UNCLASSIFIED

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756810013-9"

TRUBIN, G. K.

Bach. of Sci. - The effect of the lubrication viscocity on the endurance of the teeth of the cylindrical spiral

Vest Mash, p. 25, Sept. 51

ANTONOV, B.V.; RUDAK, Ye.G.; TRUBIN, G.L.

[Driller in underground operations of non-ferrous mines] Buril'shchik na podzemnykh rabotakh rudnikov tsvetnoi metallurgii; uchebnik dlia podgotovki rabochikh. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1953. 263 p. (MLRA 6:10)

(Mining engineering) (Boring)

NEGINA, V.R.; ZAMYATNINA, V.N.; YEGOROVA, A.A.; Prinimali uchastiye: PRESNYAKOVA, M.A.; CHIKISHEVA, L.S.; SHEVCHENKO, P.P.; TRUBIN, I.A.; MAL'KOV, V.I.

Determination of chlorine, arsenic, and phosphorus impurities in some organic materials by the activation method. Radiokhimiia 5 no.2:270-272 '63. (MIRA 16:10)

TRUBIN, I.B.

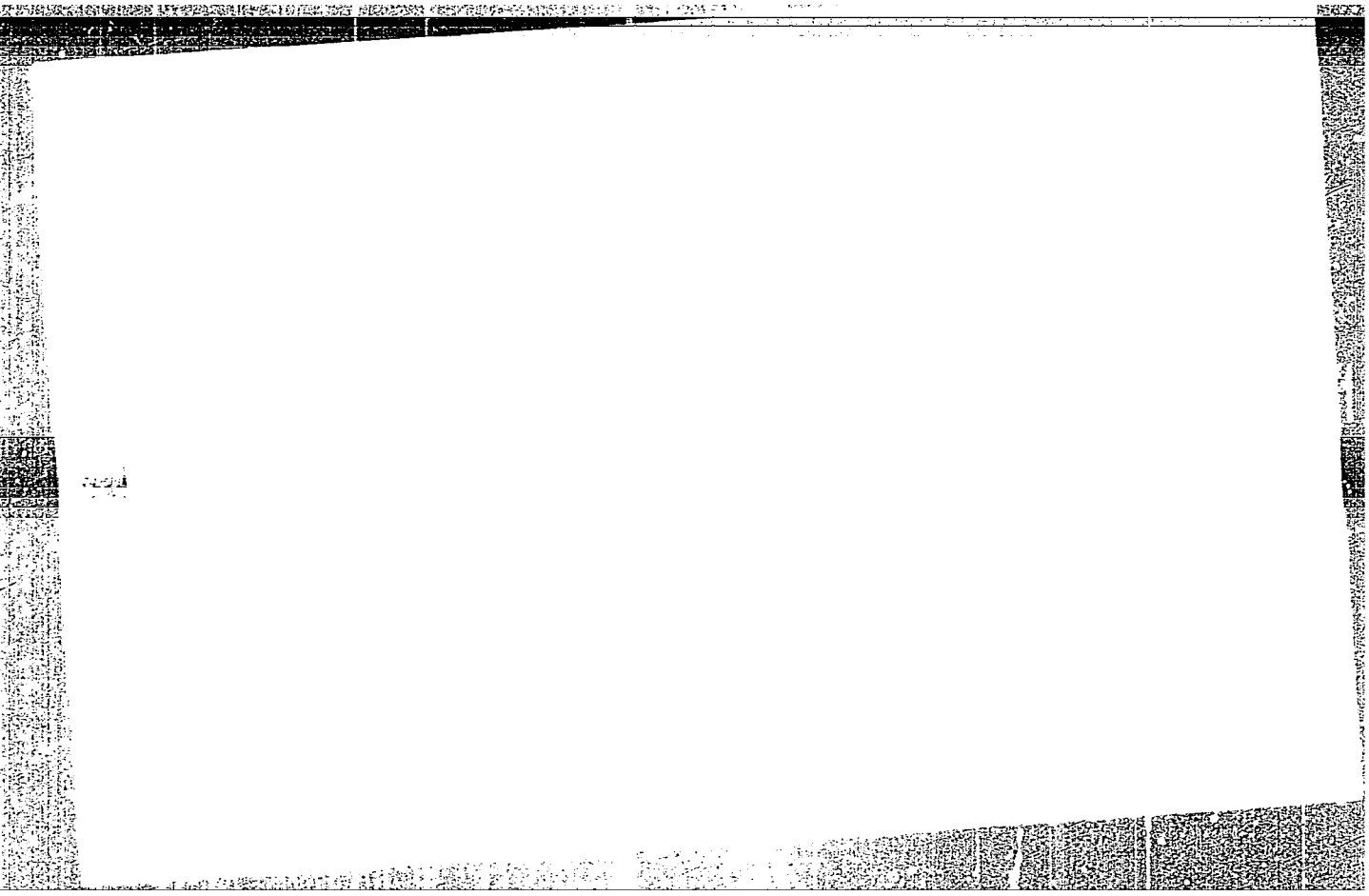
MALYSHEV, K. A., TRUBIN, I. B.

The Exposure of the Limits of Austenite Grains by Heating in a Vacuum.
Trudy IFM UFAN 10, 39, 1946

MALYSHEV, K. A.; TRUBIN, I. B.

The Effect of the Rate of Heating and of Preliminary Heat-Treatment on the Kinetics of the Growth of Austenite Grain in Carbon Steel.

Trudy UFAN 10, 215, 1941



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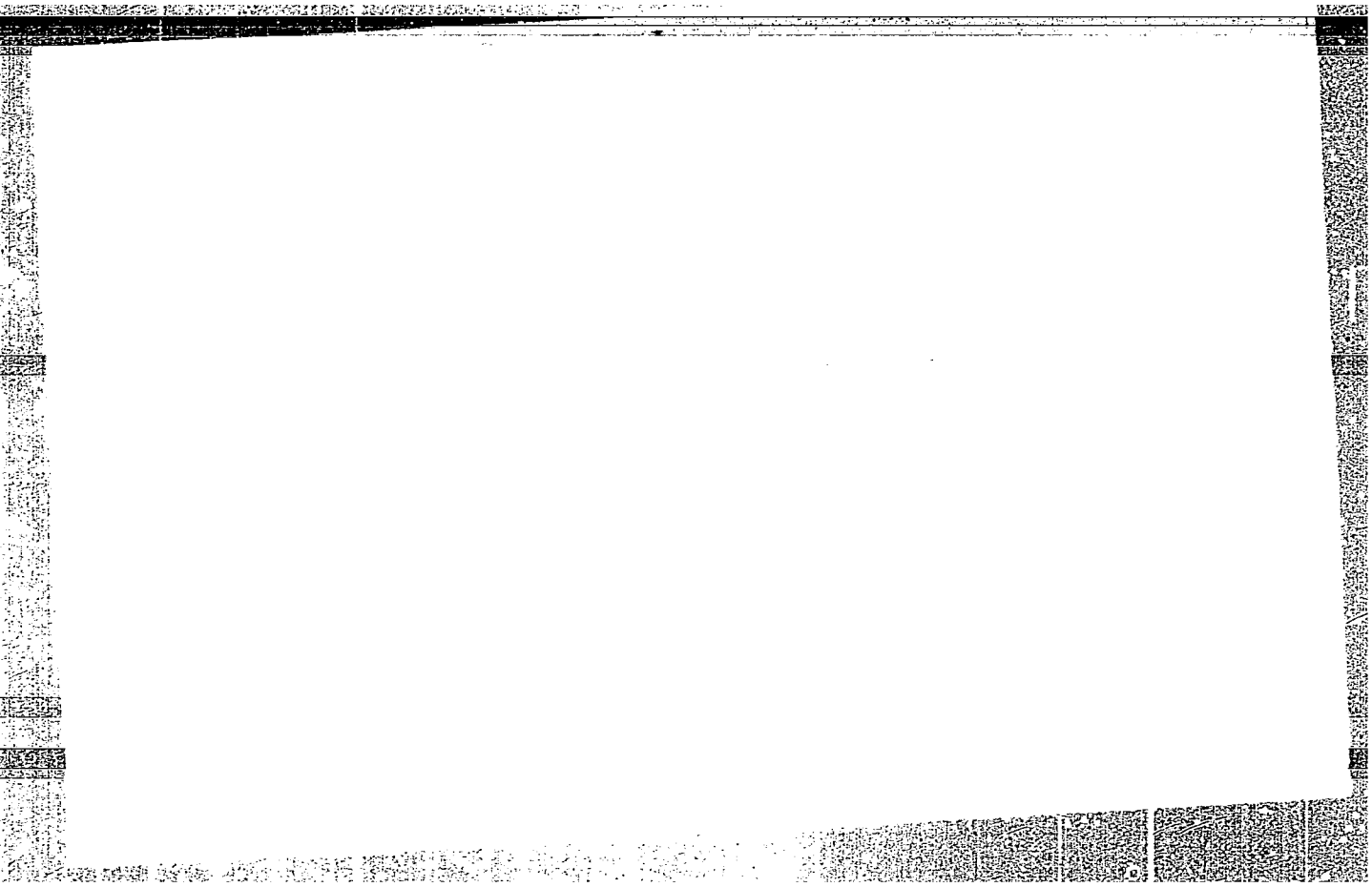
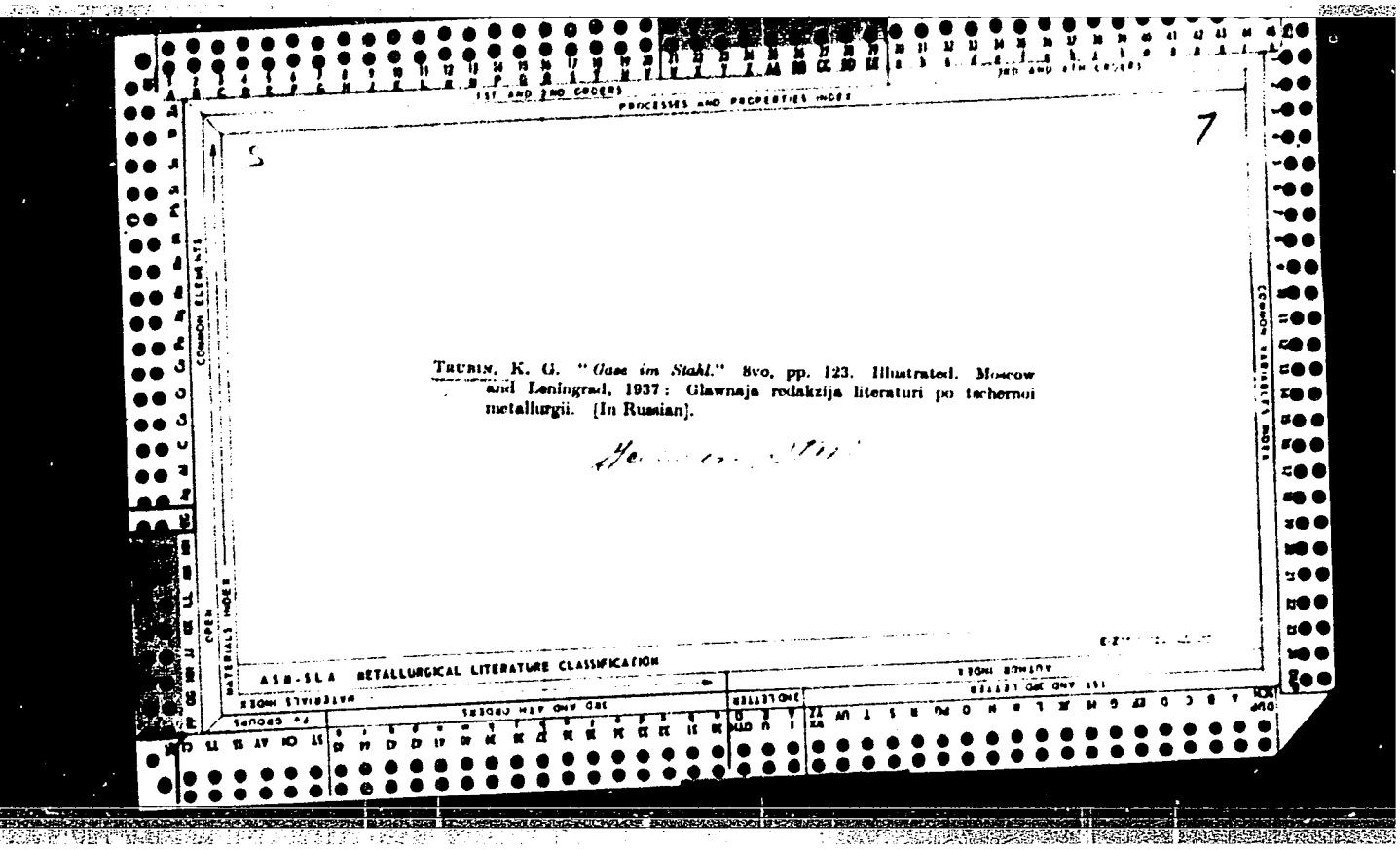
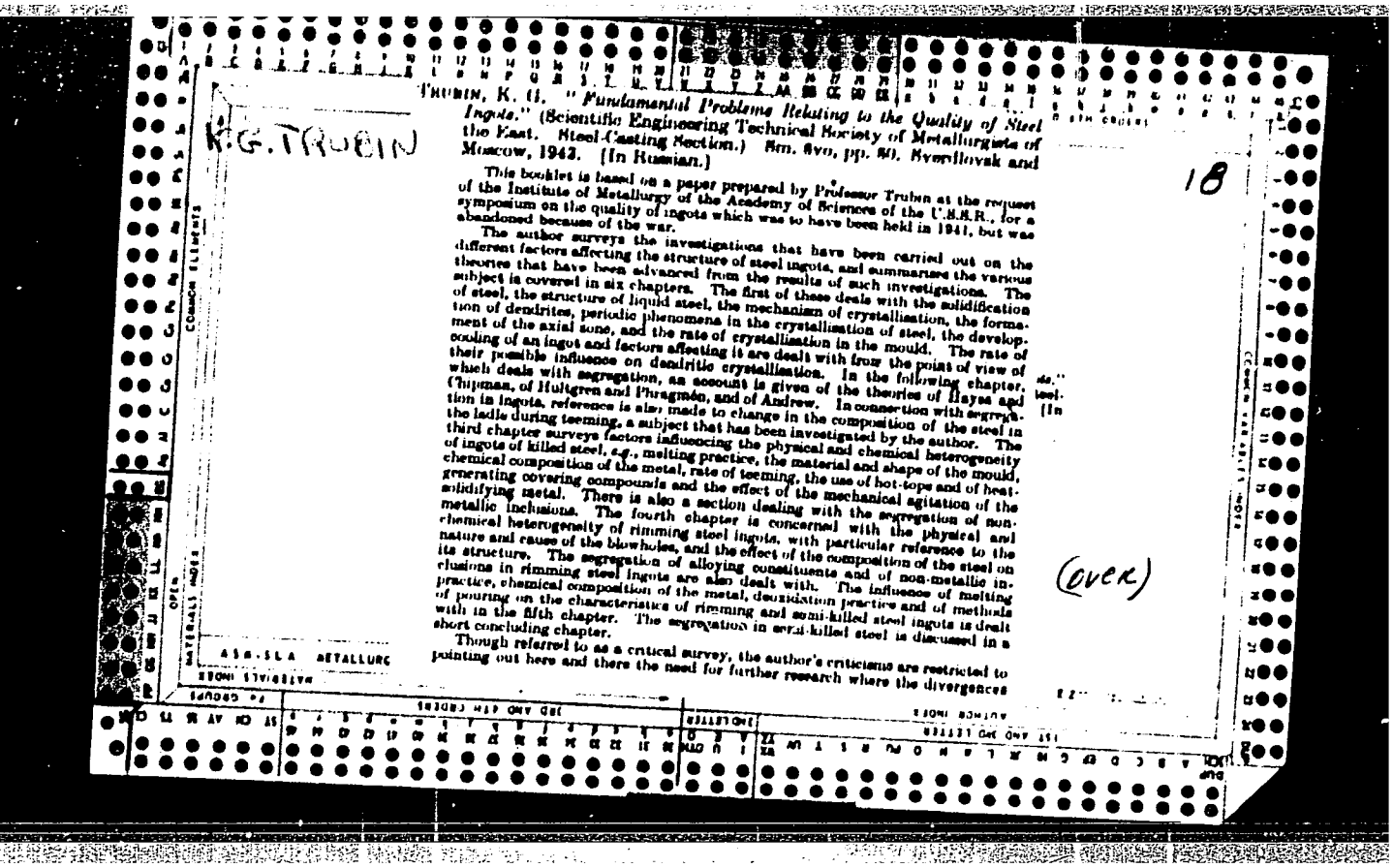


APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001756810013-9"

A review on the use of tilting furnaces in foreign countries, particularly in Britain and Germany



TRUBIN, K. G. "*Gase im Stahl.*" 8vo, pp. 123. Illustrated. Moscow and Leningrad, 1937: Glawnaja redakzija literaturi po tschernoi metallurgii. [In Russian].



K.G. TRUBIN

18

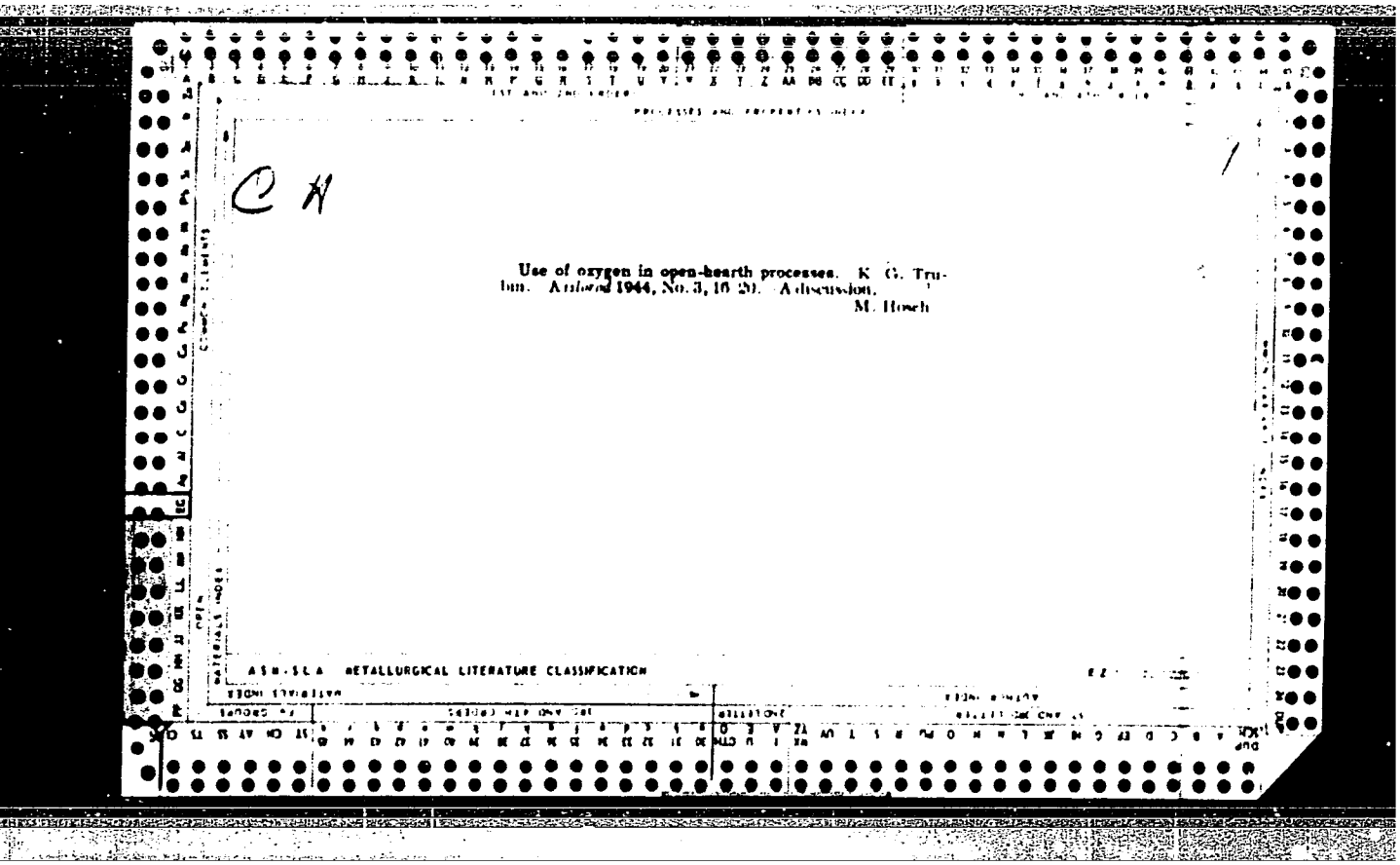
TRUBIN, K. G. "*Fundamental Problems Relating to the Quality of Steel Ingots.*" (Scientific Engineering Technical Society of Metallurgists of the East. Steel-Casting Section.) 8m. 8vo, pp. 80. Sverdlovsk and Moscow, 1942. [In Russian.]

This booklet is based on a paper prepared by Professor Trubin at the request of the Institute of Metallurgy of the Academy of Sciences of the U.S.S.R., for a symposium on the quality of ingots which was to have been held in 1941, but was abandoned because of the war.

The author surveys the investigations that have been carried out on the different factors affecting the structure of steel ingots, and summarises the various theories that have been advanced from the results of such investigations. The subject is covered in six chapters. The first of these deals with the solidification of steel, the structure of liquid steel, the mechanism of crystallisation, the formation of dendrites, periodic phenomena in the crystallisation of steel, the development of the axial zone, and the rate of crystallisation in the mould. The rate of cooling of an ingot and factors affecting it are dealt with from the point of view of their possible influence on dendritic crystallisation. In the following chapter, which deals with segregation, an account is given of the theories of Hayes and Chipman, of Hultgren and Phragmén, and of Andrew. In connection with segregation in ingots, reference is also made to change in the composition of the steel in the ladle during teeming, a subject that has been investigated by the author. The third chapter surveys factors influencing the physical and chemical heterogeneity of ingots of killed steel, e.g., melting practice, the material and shape of the mould, chemical composition of the metal, rate of teeming, the use of hot-tops and of heat-generating covering compounds and the effect of the mechanical agitation of the solidifying metal. There is also a section dealing with the segregation of non-metallic inclusions. The fourth chapter is concerned with the physical and chemical heterogeneity of rimming steel ingots, with particular reference to the nature and cause of the blowholes, and the effect of the composition of the steel on its structure. The segregation of alloying constituents and of non-metallic inclusions in rimming steel ingots are also dealt with. The influence of melting practice, chemical composition of the metal, deoxidation practice and of methods of pouring on the characteristics of rimming and semi-killed steel ingots is dealt with in the fifth chapter. The segregation in semi-killed steel is discussed in a short concluding chapter.

Though referred to as a critical survey, the author's criticisms are restricted to pointing out here and there the need for further research where the divergences

(over)



C H

Use of oxygen in open-hearth processes. K. G. Trubin. *Avtogen* 1944, No. 3, 16-20. Abstract.
M. Hoch

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Ilovin, A. K.; Girn, G. N.

Metallurgy of Steel, Open Hearth Process, (Metallurgiia Stali Martenovskii Protsess), 763 pp, Government Scientific Technical Publishing House of Ferrous and Non-Ferrous Metallurgy, Moscow, 1951.

B-68125 1 Sep 53

TRUBIN, K.

Stoff-und Warmebilanzen beim Siemens-Martin-Verfahren (Metal und Warme des Stahls) Berlin, Technik, 1953. 67 p. diagrs., tables. Translation of the final chapter of "Metallurgiya stale Martinovskiy protess" by K G. Trubin and G N Oyks, pub. in Moscow, 1951.

N/5
615.4
.A1

USSR •

Variations in the reduction processes of Kerch cast iron. G. N. Oiks and L. G. Trubin. *Izvest. Akad. Nauk S.S.S.R., Otdel. Tekh. Nauk* 1954, No. 9, 110–13.—Two processes are outlined for high-grade steel production from the high-P and V Kerch cast iron, with a recovery of V and the utilization of P_2O_5 slag. W. M. Sternberg

BARDIN, I.P., akademik; TRUBIN, K.G., doktor tekhnicheskikh nauk, professor; YEFIMOV, L.M., kandidat tekhnicheskikh nauk; TRUBETSKOV, K.M., kandidat tekhnicheskikh nauk; KORNFEL'D, V.N., kandidat tekhnicheskikh nauk; MEN'SHIKOV, R.I., kandidat tekhnicheskikh nauk; MAZOV, V.F., inzhener.

Use of oxygen in the open hearth, scrap-iron process. Stal' 16 no.6:493-505 Je '56. (MLRA 9:8)
(Open hearth process)

TRUBIN, K.G., doktor tekhnicheskikh nauk, professor.

Advantages of tilting open-hearth furnaces as compared to stationary hearths. Stal' 16 no.9:780-782 S '56. (MLRA 9:11)
(Open-hearth furnaces)

TRUBIN, Konstantin Georgiyevich, prof., doktor tekhn. nauk;
OYKS, Grigoriy Naumovich, prof., doktor tekhn. nauk

[Metallurgy of steel; the open-hearth process, technological part]Metallurgiia stali; martenovskii protsess, chast' tekhnologicheskaia. Izd.3., perer. i dop. Moskva, Izd-vo Metallurgiia, 1964. 770 p. (MIRA 17:6)

TRUBIN, Konstantin Georgiyevich; OYKS, Grigoriy Naumovich, prof., doktor tekhn. nauk; CHERNENKO, Mikhail Avksent'yevich; LUR'YE, Il'ya Naumovich; TRUBETSKOV, Mikhail Mikhaylovich [deceased]; VESELKOV, N.G., red.; VAGIN, A.A., red. izd-va; MIKHAYLOVA, V.V., tekhn. red.

[Metallurgy of steel: the open-hearth process; design and equipment of open-hearth furnaces and plants] Metallurgiia stali: martenovskii protsess; konstruktsii i oborudovanie martenovskikh pechei i tsekhov. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1961. 448 p. (MIRA 14:8)
(Open-hearth furnaces—Design and construction)

SOBOLEV, S.K., inzh.; KUDRIN, V.A., kand.tekhn.nauk; OYKS, G.N., doktor tekhn.nauk; TRUBIN, K.G., doktor tekhn.nauk, V rabote prinimali uchastiye; BLIZHYUKOV, S.A.; ROZHKOV, I.M.; MALYSHEV, V.S.

Desulfuration of pig iron outside the blast furnace by lime with the addition of aluminum powder. Sbor.Inst.stali no.39:5-15 '60. (MIRA 13:7)

1. Kafedra metallurgii stali Moskovskogo ordena Trudovogo Krasnogo Znameni instituta stali im. I.V.Stalina.
(Cast iron—Metallurgy) (Desulfuration)

TRUBIN, K. G.

PHASE I BOOK EXPLOITATION SOV/4782

Moscow. Institut stali

Proizvodstvo i obrabotka stali i splavov (Production and Treatment of Steel and Alloys) Moscow, Metallurgizdat, 1960. 462 p. (Series: Its: Sbornik, 39) 2,100 copies printed.

Ed.: Ye. A. Borko; Ed. of Publishing House: S. L. Zinger; Tech. Ed.: M. R. Kleynman; Editorial Council of the Institute: M. A. Glinkov, Professor, Doctor of Technical Sciences; R. N. Grigorash, Docent, Candidate of Technical Sciences; V. P. Yelyutin, Professor, Doctor of Technical Sciences; A. A. Zhukhovitskiy, Professor, Doctor of Chemical Sciences; I. N. Kidin, Professor, Doctor of Technical Sciences; B. G. Livshits, Professor, Doctor of Technical Sciences; A. P. Lyubimov, Professor, Doctor of Technical Sciences; I. M. Pavlov, Corresponding Member, Academy of Sciences USSR; and A. N. Pokhvisnev, Professor, Doctor of Technical Sciences.

PURPOSE: This book is intended for technical personnel in industry, scientific institutions and schools of higher education, dealing with open-hearth and electric-furnace steelmaking, metal rolling, physical metallurgy, metallography, and heat treatment. It may

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also be used by students specializing in these fields.

COVERAGE: The book contains results of theoretical and experimental investigations of metallurgical and heat-engineering processes in open-hearth and electric furnaces. Data are included on the following: desulfurizing of pig iron outside the blast furnace, interaction of oxides of the carbide-forming metals with solid carbon, the change of content of gases in the bath of the open-hearth furnace in various periods of melting, intensification of the electric melting of steel, etc. Other articles deal with the nonuniformity of deformation in rolling, the study of the continuous rolling process, the dependence of the friction—slippage coefficients in rolling on a number of factors, and other problems in the pressworking of metals. Articles on physical metallurgy and the theoretical principles and techniques of the heat treatment of steel are also included. No personalities are mentioned. References accompany most of the articles. There are 207 references, both Soviet and non-Soviet.

TABLE OF CONTENTS:

ORLOV, V.I., kand.tekhn.nauk; TRUBIN, K.G., doktor tekhn.nauk

Gas content in ingots and rolled products of chromium-nickel-molybdenum steel. Sbor.Inst.stali no.39:23-39 '60. (MIRA 13:7)

1. Kafedra metallurgii stali Moskovskogo ordena Trudovogo Krasnogo Znameni instituta stali im. I.V.Stalina.
(Chromium-nickel steel--Metallurgy)
(Gases in metals)

KRAVCHENKO, V.F., kand.tekhn.nauk; ENEKESH, Shandro, kand.tekhn.nauk
TRUBIN, K.G., kand.tekhn.nauk prof.; ABROSIMOV, Ye.V., kand.
tekhn.nauk, dots.

Effect of vibration on the quality of ingots. Izv.vys.ucheb.
zav.; chern.met. 2 no.7:23-34 Jl '59. (MIRA 13:2)

1. Moskovskiy institut stali. Rekomendovano kafedroy metal-
lurgii stali Moskovskogo instituta stali.
(Steel ingots--Vibration)

AUTHOR: Trubin, K. G., Doctor of Technical Science 133-58-5-10/31

TITLE: On Advantages of Tilting Open Hearth Furnaces (K voprosu o preimushchestvakh kachayushchikhsya martenovskikh pechey)

PERIODICAL: Stal', 1958, Nr 5, p 415 (USSR)

ABSTRACT: This is the author's answer to the discussion on the subject published in Stal', 1956, Nr 9, 1957, Nrs 5 and 6. The author points out that in view of insufficient experience in operating tilting furnaces the discussion was very limited. The comparison of operation of tilting furnaces operating at one works with fixed furnaces operating at another works ("Azovstal'" and KMK) used in the discussion is considered not convincing as the operating practices on the above works are very different. The oponents of tilting furnaces did not take into consideration their advantages in tapping. The possibility of using a tilting furnace as an active mixer servicing other furnaces were also not considered. It is stated in the editorial note that the discussion on the subject is closed. There are 4 references, 3 of which are Soviet, 1 English.

Card 1/1

137-58-6-11667

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 63 (USSR)

AUTHOR: Trubin, K.G.

TITLE: The Employment of Oxygen in Steelmaking (Primeneniye kisloroda v staleplavil'nom proizvodstve)

PERIODICAL: V sb.: Primeneniye kisloroda v metallurgii. Moscow, Metallurgizdat, 1957, pp 9-25

ABSTRACT: The employment of O_2 in converter processes has the purpose not only of intensifying the process, but of improving the quality of the metal by reducing absorption of N_2 from the blast. When the blast is enriched by O_2 it is possible to replace expensive pig iron in the charge by steel scrap, by using the excess heat of the bath. If oxygen is used in the converter it is possible to reduce the content of basic heat-carriers in the pig iron: Si in acid and P in basic processes. The enrichment of converter blast with up to 30-35% O_2 is currently part of the basic Bessemer process of a number of the West European countries. Experimental efforts by V.V. Kondakov in 1946 demonstrated the possibility of producing standard steel with 0.04% [P] from pig iron for open-hearth steelmaking. Analogous

Card 1/2

The Employment of Oxygen in Steelmaking

results were obtained later in larger converters. Later, delivery of the O_2 to the converter was done by means of a water-cooled tube introduced through the neck of the converter above the surface of the pig iron. Prior blowing of the iron in the ladle before it goes to the mixer is economically profitable. The use of oxygen in open-hearth furnaces is in accordance with two procedures. The first is enrichment of air with oxygen to burn the fuel in the working space of the furnace. In this process, oxygen consumption is $\sim$60 m^3 per ton of steel, but this is made good by a number of benefits derived from this method. The second method is that of direct oxidation of the molten bath, performed by deliverying streams of oxygen by lance directly into the fused metal. The O_2 required to blow a bath is 5-12 m^3 per t steel. It has been experimentally established that the blowing of a bath should begin when $[C] \leq 0.3$. Also practiced is a "combined" method of using O_2 consisting of successive use of the flame method during charging and melting, and blowing through the bath during the decarburization period. The furnace-operation indices obtained by this method may be attained when introduction of O_2 in the flame alone is used. The duplex process employing a converter and an open hearth with O_2 yields of exceptionally high output per shop. This process is of special interest relative to conversion of high-phosphorus pig irons to steel. 1. Steel--Production 2. Oxygen--Applications

Card 2/2

V.K.

137-58-6-11681

Translation from Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 65 (USSR)

AUTHORS: Trubin, K.G., Trubetskov, K.M., Orlov, V.I.

TITLE: Use of Oxygen in the Open-hearth Scrap-and-ore Process (Primeneniye kisloroda v martenovskom skraprudnom protsesse)

PERIODICAL: V sb.: Primeneniye kisloroda v metallurgii. Moscow, Metallurgizdat, 1957, pp 68-94

ABSTRACT: A detailed investigation at the Zaporozhstal' plant with open-hearth furnaces (200-t batch) having magnesite-chromite roofs has resulted in the recommendation that a heat regime be employed in which the air is enriched by O_2 by as much as 25%. When this is done, the output of the furnace rises by 26% and the unit nominal consumption of fuel diminishes by 17%. A further increase in the enrichment of the air to 30% carries with it a continuous increase in the productivity of the furnace of up to 46.0%. The duration of the heat is cut chiefly by saving on the melt-down and working periods. Here O_2 serves not only to intensify fuel combustion, but to increase heat gain from completion of the combustion of the CO, thus causing the open-hearth furnace to approximate the surface-blown

Card 1/2

137-58-6-11681

Use of Oxygen in the Open-hearth Scrap-and-ore Process

Bessemer process. During the working period there is an increase in the V_{heat} of the metal, which attains 60-80°C/hr. There is a corresponding rise in rate of addition of Fe ore, with an increase in rate of decarburization to 0.88%/hr. At increased flow, the temperature conditions of the brickwork do not go beyond the bounds of the set standards, and the efficiency of the furnace proper rises to 0.413. The use of O_2 for direct oxidation of impurities is most efficient at high initial [C]. Thus, when oxygen is blown in during the melt-down and working periods, the output of the furnace rises by 39% when the total unit consumption of O_2 is increased to 12 m^3/t. Oxygen blow into a bath with 0.5-0.6% C reduces the heat by 45-55 min. The quality of the steel remains virtually unchanged with the various methods of intensifying the heat.

Yu.N.

1. Open hearth furnaces--Performance 2. Oxygen--Applications
3. Metals--Processing

Card 2/2

137-58-6-11760

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 78 (USSR)

AUTHORS: Trubin, K.G., Oyks, G.N.

TITLE: Choosing the Mode of Conversion of Kerch Pig Iron (O vybore peredela kerchenskogo chuguna)

PERIODICAL: V sb.: Primeneniye kisloroda v metallurgii. Moscow, Metallurgizdat, 1957, pp 160-164

ABSTRACT: Two methods are suggested for conversion of the high-phosphorus pig iron obtained by smelting Kerch ores. The duplex process is used in either process. Under the first procedure, the iron is blown briefly (2-3 min) in a basic converter by air enriched with oxygen, to convert the V to slag. After slagging off the vanadium slag, the converter is charged with lime and the metal is blown further to produce a low-carbon half-finished metal with 0.1% P. After slagging off the phosphate slag, to which silicon is added to produce conditioned fertilizer, the semifinished product is processed in the open hearth, to which a solid carburizer is added. The second method provides that, after the short blow with an O_2-enriched blast to obtain the vanadium slag, an iron-and-lime slag made in a special

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Choosing the Mode of Conversion of Kerch Pig Iron

furnace is charged into the converter, and the metal is again blown with O_2-enriched air or by a mixture of O_2 and CO_2. This procedure yields a high-carbon melt with low [P]. After the phosphate is slagged off, the semifinished product is transferred to an open hearth for the final treatment. High [C] makes possible the smelting of any desired high-quality steel. Steel of a number of grades may be made from high-phosphorus pig irons by either method, directly in the converter.

M.O.

1. Iron--Processing 2. Steel--Production 3. Furnaces--Operation

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137-58-6-11682

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 66 (USSR)

AUTHORS: Kharitonov, A.S., Trubin, K.G.

TITLE: Use of Oxygen in the Burner Flame to Intensify Carbon Removal in an Open-hearth Bath (Primeneniye kisloroda fakel'nym sposobom dlya intensifikatsii obezuglerozhivaniya martenovskoy vanny)

PERIODICAL: Sb. Mosk. in-t stali, 1957, Vol 37, pp 38-79

ABSTRACT: Results are presented of a study of the effectiveness of the enrichment of blower-delivered air in open-hearth furnaces with up to 25-28% O_2 during the periods of charging, heating, melt-down, and working of the heat. The experiments were run in 185-t open-hearth furnaces at the Zaporozhstal' plant, heated by an uncarburetted mixture of coke and blast furnace gas, as 08 kp steel was made by the scrap-and-ore process. [C] was 0.7-1.4% of the molten metal. When air enriched with up to 28% O_2 was used during >70% of the boiling time, the speed of carbon removal almost doubled. This was the result of the high speed of transport of O_2 from the gas phase into the metal in experimental heats, this was found to be

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Use of Oxygen in the Burner (cont.)

9.4 kg/m^2 hr as against 5.7 kg/m^2 hr in standard heats. This last is explained chiefly by the presence of an increased gradient of Fe_2O_3 contents between the upper and lower layers of slag in the portion of the bath adjacent to the oxygen tuyeres. Improvement in heat exchange in the furnace proper thanks to the increase in the oxidizing capacity of the flame made it possible to raise the mean hourly rate of heating of the metal during the boil period from 30-50°C in ordinary heats to 100° in heats with air enriched with up to 28% O_2, the heat input being virtually identical. This made possible high-ore heats. The mean time saving per heat when O_2 was used during up to 65% of the boil period was 6 min per m^3O_2/ton ingots. The yield of satisfactory metal and its quality were equivalent to the usual. In the scrap-and-ore process the use of O_2 during the period of boil is no less effective than during the charging, heating, and melt-down periods.

A.D.

1. Open hearth furnaces--Performance 2. Oxygen--Applications 3. Carbon--Reduction

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TRUBIN, K. G. (Prof., Dr. Tech. Sci.); ABROSIMOV, E. V.; ANSHELES, I. I.;

"The Distribution of Tungsten Between the Metal, Slag and Gas Phases in the Smelting of Steel by the Basic Process," in the Book: The Application of Radioisotopes in Metallurgy, Symposium XXXIV; Moscow; State Publishing House for Literature on Ferrous and Nonferrous Metallurgy, 1955.

Prof. K. G. TRUBIN, Dr. Tech. Sci.; E. V. ABROSIMOV, Assistant; I. I. Ansheles, Assistant/ Chair of Steel Metallurgy, Moscow Inst. of Steel im I. V. Stalin.

TRUBIN, K. G. (Prof.)(Dr. Tech. Sci.); SHIMON, Sh.; ABROSIMOV, E. V.

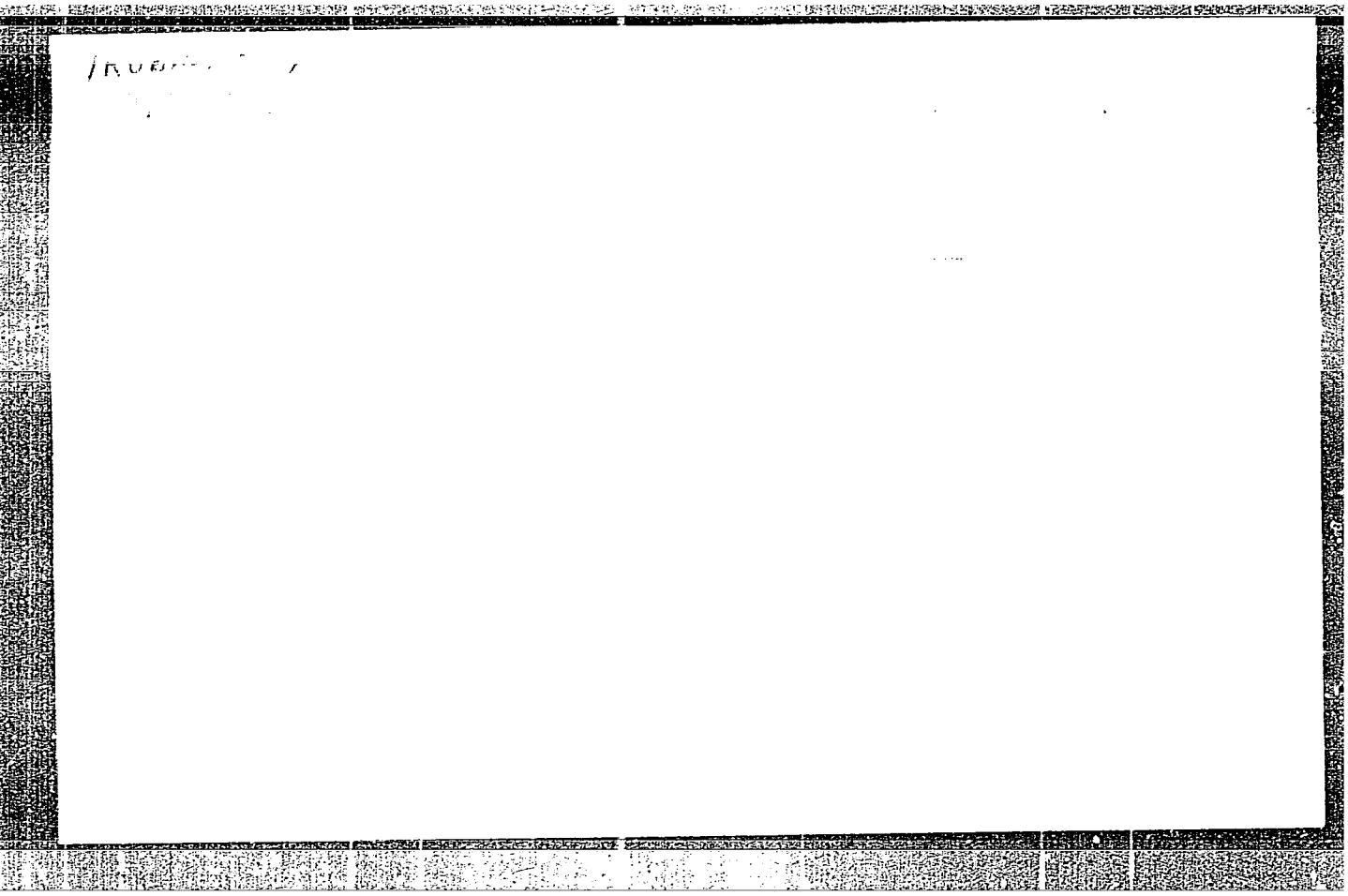
"Desulphuration at the Purging of Metal with Oxygen," in book The Application of Radioisotopes in Metallurgy, Symposium XXXIV, Moscow; State Publishing House for Literature on Ferrous and Nonferrous Metallurgy, 1955.

Prof. K. G. TRUBIN, Dr. Tech. Sci.; Sh. SHIMON: E. V. ABROSIMOV, Chair of Steel Metallurgy, Moscow Inst. of Steel im I. V. Stalin

TRUBIN, K. G. (Prof., Dr. Tech. Sci.); YEZHOV, G. I. (Engr.): ABROSIMOV, E. V. ; I. I. ANSHELES;

"The Effort of Teeming Conditions upon the Quality of Pipe Steel," in book The Application of Radioisotopes in Metallurgy, Symposium XXXIV; Moscow; State Publishing House for Literature on Ferrous and Nonferrous Metallurgy, 1955.

Prof. K. G. TRUBIN, Dr. Tech. Sci.; G. I. YEZHOV, Engr.; E. V. ABROSIMOV, Assistant; I. I. ANSHELES, Assistant, Chair of Steel Metallurgy, Moscow Inst. ofSteel im I. V. Stalin.



TRUBIN, K. G.

KHARITONOV, A.S., kand.tekhn.nauk; TRUBIN, K.G., prof., doktor tekhn.nauk

Using an oxygen lance to intensify the decarbuization of open-hearth furnace baths. Sbor. Inst. stali no.37:38-39 '57. (MIRA 11:3)

1.Kafedra metallurgii stali Moskovskogo instituta stali im. I.V. Stalina.

(Open-hearth furnaces)
(Oxygen--Industrial applications)

TRUBIN, K. G.

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Trubin, Konstantin Georgiyevich, Doctor of Technical Sciences, Professor, and Oyks, Grigoriy Naumovich, Doctor of Technical Sciences, Professor

Metallurgiya stali. Martenovskiy protsess; chast' tekhnologicheskaya (Metallurgy of Steel. The Open-hearth Process; Technical Section) 2d ed., rev. and enl. Moscow, Metallurgizdat, 1957. 714 p. 9,000 copies printed.

Ed.: Miller, A. I.; Ed. of Publishing House: Rozentsveyg, Ya. D., Tech. Ed.: Mikhaylova, V. V.

PURPOSE: This is a textbook for students of higher educational institutions and may also be used by production engineers at metallurgical and machine-building plants.

COVERAGE: The book gives a systematic presentation of the theoretical basis and practical aspects of the basic and acid open-hearth processes; it also treats pouring methods and properties of ingots. This second edition contains additional material on recent technological advances in open-hearth production, new methods of processing molten steel in a vacuum,

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and continuous casting of steel. There are 236 references, of which 164 are Soviet, 52 English, 28 German, and 2 French.

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